

Multi-picture in picture system

The invention relates to a multi-picture in picture system comprising at least two cameras linked as a chain together.

Cameras linked as a chain are, for example, known from WO98/39739 wherein a system is described for data processing with motion analyzes. The different cameras having different degrees of information content.

The television/monitor, which receives the pictures from the different cameras, creates the total picture to be viewed.

The invention has for one of its object to provide a multi-picture in picture system, which is economically constructed.

To this end a multi-picture in picture system according to the invention comprises the features of claim 1.

In this way a multi-picture in picture system is obtained using a CVBS-line (Composite Video Baseband Signal). By adding each picture on the CVBS-line each picture can have the maximum frame rate.

A first camera acts as a system master whereby the other camera(s) are each locked to a previous camera.

By locking each camera to a previous camera problems of different delays are overcome. Each camera adds its part of the picture at the place in the daisy-chain cable where the camera also is locked. So each locking place and insertion place is the same which results in no problems with relation to unknown delays.

This overcomes the problem prior art systems have, that is such systems have to cope with this kind of problems because the locking of the color carrier has to have a precision of about 5 nano second while a cable with a length of 100 meters can have a delay of 1 micro second.

The length of the cable which determines the total delay is no longer relevant.

Instead of the known systems where the television/monitor has to cope with the multi picture in picture creation, in the system according to the invention the television/monitor has not to cope with this situation so can be much cheaper.

5 In the system according to the invention each camera creates its picture at the "place" in the total picture.

Embodiments of the invention are described in the dependent claims.

10 These and other objects of the invention are described hereinafter by way of example with reference to the non-limiting examples.

Herein shows:

Fig. 1 schematically an example of a multi-picture in picture system according to the invention,

15 Fig. 2 schematically an example of a screen with multi picture in pictures, and Fig. 3 schematically an example of a camera for use in a system according to the invention.

Figure 1 shows schematically an example of a multi-picture in picture system MPIPS according to the invention.

20 In this example this system comprises n camera's CAM1-CAMn, linked together with a CVBS signal as a daisy chain. After the last camera CAMn a monitor MON is coupled to make the result visible on a screen S of the monitor.

25 Each camera can insert on the CVBS line a part of its observed picture or a downscaled version of that picture. The location and size of the inserted picture is programmable per camera.

30 A first camera CAM1 acts as a system master and the other cameras are locked to the previous camera to horizontal synchronization, vertical synchronization and color phase locked to the system/master. In this manner it is possible to cope with different delays. Because the insertion of the picture and the locking is at the same place and timing so no differences in delay occur.

Figure 2 shows a picture screen P2 with nine pictures 1-9 in a multi picture in picture, whereby each picture is made ready in each camera with the maximum frame rate on the CVBS signal.

Instead of prior art systems where the pictures 1-9 don't have the maximum frame rate and where the pictures are also not prepared on the CVBS-line.

Figure 3 shows schematically a camera CAM3x coupled with an input I3 to a previous camera (x-1) on which camera (x-1) the camera CAM3x is locked. The camera records a picture on a sensor SEN3 and supplies the recorded picture to the daisy-chain (CVBS-line) at the output O3.

The input I3 is coupled to input processing means INPROS3. The input processing means supply a signal to output processing means OUTPROS3. The output processing means also receives the signal from the sensor SEN3.

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The length of the cable which determines the total delay is no longer relevant. Instead of the known systems where the television/monitor has to cope with the multi picture in picture creation, in the system according to the invention the television/monitor has not to cope with this situation so can be much cheaper.

In the system according to the invention each camera creates its picture at the "place" in the total picture.

The man skilled in the art will be well aware that the above examples are not limitative for the invention concerned. It is of course possible to change the number of pictures or cameras. One of the main items of the invention is that in the system according to the invention for the main part the cameras prepare the pictures to be displayed on the television/monitor and not the television/monitor.

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